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Issued December 21, 1907.

U. S. DEPARTMENT OF AGRICULTURE.

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FARMERS' BULLETIN 313.

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# HARVESTING AND STORING CORN.

BY

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WASHINGTON:  
GOVERNMENT PRINTING OFFICE.  
1907.



## LETTER OF TRANSMITTAL

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF PLANT INDUSTRY,  
OFFICE OF THE CHIEF,  
*Washington, D. C., October 2, 1907.*

SIR: I have the honor to transmit herewith a manuscript entitled "Harvesting and Storing Corn," by C. P. Hartley, Physiologist in Charge of Corn Investigations, and recommend that it be published as a Farmers' Bulletin.

The proper harvesting and storing of corn is a matter of prime importance not only to obtain the full value of the crop but also to secure the highest market price for the corn.

The illustrations which accompany this manuscript are necessary to a proper understanding of the text.

Respectfully,

B. T. GALLOWAY,  
*Chief of Bureau.*

Hon. JAMES WILSON,  
*Secretary of Agriculture.*



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# HARVESTING AND STORING CORN.<sup>a</sup>

## INTRODUCTION.

The production of a large crop is of course the subject of most importance in corn growing, but there is need of much care and labor in harvesting and storing the crop after it is produced in order to obtain its maximum value.

## THE SILO.

On most well-managed farms the work of harvesting and storing the corn crop begins with the filling of the silo. Corn is one of the best crops for this purpose, if not the very best. Sorghum stands dry weather much better than corn and for dry regions is a surer crop, but it is more inclined to fall down and become tangled than corn, thus making it somewhat more difficult to place in the silo. This difficulty is overcome to a large extent by growing the two crops together, and the ensilage made from these two crops grown together is usually superior to that from either crop grown separately.

When the silo first came into use it was thought necessary to fill it with very green succulent growth. This is now known to be an erroneous idea, and the silo is regarded much as a storeroom or food preserver, the value of the ensilage depending to a very great extent on the nutritive value of the crop with which the silo is filled. To this end it is advisable that the corn shall have reached a degree of ripeness indicated by rather hard, well-dented or glazed kernels and partially dried husks before it is placed in the silo. There is a week or ten days when the ears are in this condition and the stalks still contain sufficient sap to cause the silage to pack well in the silo. It is even better to add a little water to accomplish the latter purpose than to cut the crop before it has attained its full feeding value.

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<sup>a</sup>The following Farmers' Bulletins in reference to Indian corn (maize), its culture, harvesting, storage, etc., will be sent without cost upon the receipt of a request therefor addressed to the Secretary of Agriculture, Washington, D. C.: No. 32, Silos and Silage; No. 81, Corn Culture in the South; No. 199, Corn Growing; No. 229, The Production of Good Seed Corn; No. 253, The Germination of Seed Corn; No. 292, Cost of Filling Silos; No. 303, Corn-Harvesting Machinery.



Many of the State agricultural experiment stations have published valuable bulletins treating of ensilage and the silo, and Farmers' Bulletins 32 and 292 of the Department of Agriculture treat especially of this subject. This publication will, therefore, deal more especially with other methods of harvesting and storing the corn crop.

### **CORN AS A FORAGE CROP.**

Unless to be used for ensilage or cut green and fed directly to stock, it is very seldom profitable to grow corn exclusively for forage. Even when grown for the purpose of filling a silo, the feeding value of the crop is very greatly increased by the amount of grain put in the silo. If hay or forage alone is desired, independent of grain, it can usually be more satisfactorily produced by growing alfalfa, clover, cowpeas, or sorghum than by growing corn. In addition to having a higher feeding value than corn stover, alfalfa, clover, or cowpeas will enrich the soil on which they are grown. The removal year after year of crops of corn or sorghum will rapidly impoverish a soil unless an equivalent amount of humus and fertility is returned to it.

### **STRIPPING THE BLADES.**

In some sections, especially in the Southern States, the practice of stripping the blades by hand from the standing stalks has for years been one of the established operations in connection with harvesting the corn crop. There is no question that the blades when thus gathered and well stored furnish an excellent forage, but there are cheaper methods of obtaining forage of as good or better quality.

Experiments and calculations as to cost and value have been made by the Georgia Experiment Station<sup>a</sup> and other stations in the Southern States, and the conclusion has been reached that the stripping of corn blades is unprofitable and should be discontinued.

### **TOPPING.**

It is still quite a common practice in some localities to top the stalks by cutting them just above the ear. By this method the portion of the stalk which is eaten by stock most readily and with least waste is obtained. When the grain crop is late in maturing or wet fall weather prevents the proper drying of the ripening ears, the topping of the corn may be found advisable. If the ears have become hard, the kernels dented, and the husks partly dry before the topping is performed, no reduction in yield will result. A heavy growth of cowpeas may make the cutting of the entire plant impracticable and war-

<sup>a</sup> Georgia Experiment Station Bulletin No. 74, p. 208. 1906.

rant the topping of the crop. If the corn is desired for seed, topping will facilitate the drying of the ears and thus make it possible to select the seed before it is injured by freezing. Ordinarily, however, it is found more expensive to top a corn crop than to cut and shock the entire plant.

Experiments conducted by the agricultural experiment station at Auburn, Ala., indicate that a greater profit is obtained by cutting and shocking the entire plant than by topping.

### **CUTTING AND SHOCKING COMPARED WITH HUSKING FROM THE STANDING STALKS.**

Over large areas in the principal corn-growing States corn is grown primarily for the grain, and each farmer decides for himself how much of the crop will be cut. This is usually determined by cutting just enough to feed the animals maintained on the farm. The chief objection to this method is that many farmers do not maintain enough animals to consume all of the corn stover produced. If the ears are gathered from the standing stalks and no use is made of the stover, fully one-third of the crop is wasted. The term "fodder" is applied to the entire plants as ordinarily cut and shocked, while the term "stover" is applied to the portion remaining after the ears have been pulled or husked.

Generally speaking, there is little difference in cost between husking and cribbing corn from the shock and husking and cribbing it from the standing stalk. In some sections men will husk from standing stalks at a lower price than from shocks, but the cost of teams, although they are not usually very busy with other work during corn-husking season, must be taken into consideration. Considering the expense of husking from the standing stalk and from the shock as equal, it is evident that the stover has been obtained for the money paid for having the corn cut and shocked. This cost of cutting and shocking is very much less than the value of the stover if it be properly stored and fed. If left in the field until February or March exposed to the winds and rains of winter, it is questionable whether its feeding value is equal to the cost of cutting and shocking.

There are sections in the Central and Southern States where the soil is rich and the growing season long, causing the corn to make a large, tall growth of stalk which does not furnish a good quality of stover. In such sections it may be better to obtain the necessary quantity of forage by cutting several hay crops each year than by saving the corn stover. This is especially true in localities where warm, damp weather causes the corn stover to lose its feeding value rapidly.

## TIME OF CUTTING.

In the sections where corn is grown extensively and primarily for the grain, but where it is cut and the stover fed, the time of cutting is governed by the effect which the cutting will have on the ears. When grown for grain it is not advisable to cut until the kernels have become well dented and hard and the husks partly or entirely dried. From the time the corn reaches this condition there is ordinarily a period of about ten days or two weeks in which the stover has a high feeding value and the production of grain per acre is not materially decreased by cutting. After heavy frosts, or after the leaves become brown and the stalks dry, the expense of cutting is greater than the feeding value of the stover obtained. When cut during the period above mentioned, corn stover has approximately the same value as timothy hay and can accordingly be valued at \$6, \$8, or \$10 a ton. If cutting is delayed until the corn is mature enough to husk and crib or if small shocks of stover are left standing in the field till spring, the feeding value of the product is scarcely worth the expense of feeding it and returning the stalks to the land. There are all kinds of corn stover, and the principal factors governing the quality of any particular kind are time of cutting and care in storing.

The above statements apply to cases in which the corn is grown for grain. The cutting of corn when the ears are in the roasting-ear condition or as they are beginning to glaze makes a more palatable stover, but the full feeding value of the crop is not obtained by such early cutting.

## METHODS OF CUTTING.\*

Several methods of cutting are now generally followed: By hand; with a horse cutter drawn as a sled or on wheels between the rows; with a corn binder; and with a corn shocker. In the Northern States the corn binder is very widely used. The stalks attain a height of from 5 to 9 feet and are cut and bound very satisfactorily by means of corn binders. In the extreme north, where the stalks are but 5 feet or less, a wheat binder is sometimes used in cutting and binding the corn crop. The use of the wheat binder for this purpose, however, is not recommended, because the machine is not built for such heavy work. On the river bottoms of the Central and Southern States, where the stalks are large and attain a height of 12 or more feet, with the ears 6 feet or more from the ground, the corn binder does not meet with general favor. Doubtless binders constructed for just such

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\* For illustrated descriptions of various kinds of implements and machinery used in the harvesting of corn, see Farmers' Bulletin 303, entitled "Corn-Harvesting Machinery."

crops as these would meet with greater favor than the binders designed for corn of average height.

The method of cutting is governed not only by the height of the stalks but also by the quantity of corn to be cut. Where farms are small and the area to be cut is less than 20 acres, cutting by hand or by such a cutter as is shown in figure 1 is found more profitable than maintaining expensive machinery for the purpose. Where a large acreage is to be cut during the limited time within which it is most profitable to cut corn, corn binders or corn shockers are necessary and are the most economical means of harvesting.

### HAND CUTTERS.

Although there are circumstances under which the cutting of corn by hand is advisable, there are still cut by this laborious method many acres which could more profitably be cut by corn-harvesting machinery.

Various localities have their peculiarities in regard to methods of cutting corn by hand, kinds of knives used, etc. Figure 2 shows forms of knives that give most general satisfaction. In the hand of

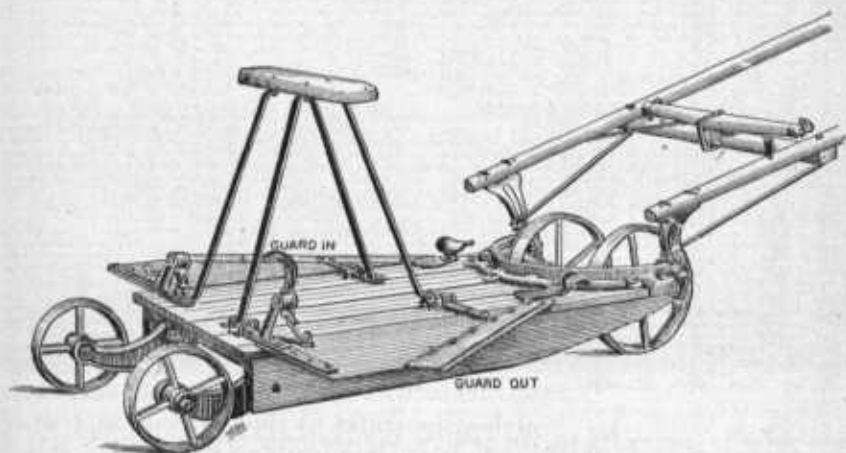


FIG. 1.—Corn harvester with automatic knife guards.

the man shown in figure 3 is another form of knife that is very generally used. The same figure shows a shocking horse that is very convenient where the corn is cut by hand and one shock is completed before beginning another. A shocking horse is also very serviceable for shocking after a corn binder, especially when but one man is shocking. Some cutters prefer to tie down supports by twisting together, at proper intervals through the field, four adjoining hills. The tying together of these four hills forms what is known in some localities as gallowses, which support the stalks in beginning a shock. By tying down a row entirely through the field a very

convenient system of cutting can be pursued by cutting from one shock to the next, up one side of the shock row and down the other. A very great deal of hard labor might be saved and more corn cut per day if everyone when cutting corn would adopt a definite system of procedure in cutting and building a shock.

Figure 4 explains a good method of cutting small shocks eight hills square, and can be employed by the use of the shocking horse or by tying down the four central hills as indicated in the illustration. For the first armload, hills 1, 2, 3, 4, 5, 6, 7, and 8 should be cut in the order given, and the armload stood at the point indicated by the letter *a*. The numbers and letters in the figure indicate the order

in which the hills are cut and the location in which the fodder is placed. By cutting each shock after this definite system very many unnecessary steps can be saved. Other systems of equal merit can be adopted for cutting shocks of different sizes. Without a definite system of procedure much time is lost and many unnecessary steps are taken.

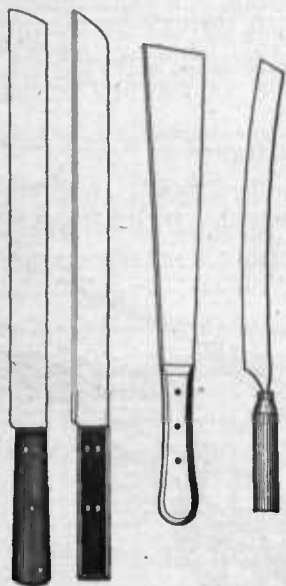


FIG. 2.—Four types of corn knives that give satisfaction.

#### HORSE-POWER CUTTERS.

There are many inexpensive forms of corn cutters similar to the one shown in figure 1 which by the use of a horse, or two horses hitched one in front of the other, will enable two men to cut and shock corn more rapidly and with less fatigue than by hand. In some cases the cutter is drawn on runners as a sled, but the saving in draft warrants the use of wheels. A man on each side catches the stalks as they are cut, and when the shock row is reached the horse is stopped and the fodder placed in the shock. A man with a little skill can construct such a cutter on the farm, and by means of adjustments at the points at which the wheels are attached, the knives can be elevated or lowered to cut the corn at the desired height. By the attachment of other knives lower and in the rear of the upper ones the stubs may be cut at the same operation. Inasmuch as horse power is used for cutting by this method and there are no expenses for twine or repairs and but a small outlay for machinery, it is one of the cheapest methods of cutting and shocking corn.

**BINDERS.**

The corn binder with bundle carrier, as shown in figure 5, is satisfactorily used in cutting corn of average or small size on land that is not very steep or stumpy. On the comparatively-level prairie land of the North Central States the corn binder is very generally used in cutting and shocking corn. In light corn or on level land two horses will suffice, but for faster work or heavy corn the use of three or four horses is much more satisfactory. Three men, one to run the binder and two to shock, and two teams can cut and shock about 7 acres of corn a day. However, conditions vary to such an extent regarding the weight of the corn crop, the lay of the land, etc., that it



FIG. 3.—A corn-shocking horse.

is impossible to give figures that will apply to all cases. Under normal conditions and with an average corn crop the cost of cutting and shocking by means of the corn binder is about \$1.50 per acre. In sections where the corn binder is successfully used the principal objections to its use are the cost of twine, which remains upon the fodder but a short time, and the knocking off of ears in the process of binding. In almost all cases the quantity of corn knocked off by the binder is great enough to warrant driving a wagon over the field and gathering the ears from the ground after the corn is cut and shocked. This is necessary because the presence of the shocks in the field prevents the turning in of hogs or cattle to gather up the ears knocked off by the binder.

The use of a binder with a bundle carrier saves very much of the hard labor of cutting and shocking, and the greater ease of handling the fodder when bound into bundles of convenient size saves labor enough to compensate for the twine used.

The stubble cutter should be attached to the corn binder whenever possible, as the early cutting of the stubs hastens their decay and puts the ground in a better condition for the following crop.

#### SHOCKERS.<sup>a</sup>

The corn shocker has not as yet met with as much favor as the

corn binder, though it is now used extensively in some localities, especially in Ohio. The principal point in favor of using the corn shocker is the saving of hard manual labor. Almost all of the hard work is performed by the teams. The cost of twine is not as great as in the case of the binder, but much more difficulty is experienced in handling the fodder when the shocks are made

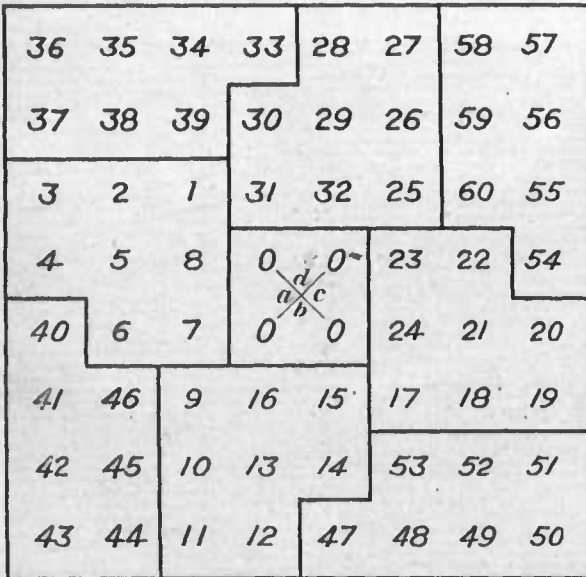


FIG. 4.—Diagram showing a method of cutting shocks eight hills square.

by the shocker. The variety of movements necessary in stopping the team, unloading the shocks, and preparing the shocker for cutting the next shock are somewhat against the use of this machine by all classes of farm help. With further simplification the shocker may come into general use for harvesting corn.

#### SHOCKING.

No matter what method is employed in cutting the corn, it is very important that the shocks be made and tied in a manner that will cause them to stand erect and keep the fodder dry. Everyone who has husked corn from the shock in the winter or hauled in shocked

<sup>a</sup> For a description and illustration of the corn shocker, see Farmers' Bulletin 303.



corn knows the annoyance and great loss due to poor shocking. It would seem as though anyone would know how to shock corn fodder, and especially anyone raised on a farm. Perhaps everyone does know how, but the large proportion of twisted and fallen shocks seen in every locality where corn is grown, especially where it is grown extensively, is conclusive evidence that many do not properly shock their fodder. To this carelessness is due the loss of millions of dollars' worth of stover, to say nothing of the grain that is also ruined.

#### BUILDING AND TYING THE SHOCK.

The stalks should be stood evenly about the shocks, with just enough slant to make them stand well against the shock. The slight



FIG. 5.—Corn binder with bundle carrier in operation.

slant they have should in all cases be toward the center of the shock. Too much slant is very objectionable, because in settling the slant increases and causes the shock to take water. The shocks should be tied as soon as they are made. This will prevent them from twisting or allowing the stalks to blow down before they have settled in place. Some prefer to wait until the fodder has cured a few days before tying, so that they may be tied tighter. A much better method is to tie them when first made and in about ten days tighten the ties. For tying the shocks, binder twine is the most satisfactory. A half-inch rope some 9 or 12 feet long, depending upon the size of the shocks, with a small well-curved hook made of one-half inch iron rod



tied in one end of the rope, is of great assistance both in tying and in tightening the ties around the shocks. The rope is placed around the shock near the top and the ring hooked over, and the rope is then drawn tightly and the loose end placed under in order to hold it securely while the binder twine is being placed in position and tied. If the corn is quite tall there is an inclination to tie the shocks too low. The tying should always be done within 2 or 3 feet of the top of the shock.

#### SIZE OF SHOCKS.

In dry climates and where the corn becomes well ripened about the time cool fall weather sets in, the corn shocks should be large—14, 16,



FIG. 6.—Rows of shocks placed well apart to facilitate drilling wheat.

or perhaps 18 hills square. Being in the right stage of maturity and with the weather dry and cool, these large shocks will not heat or spoil, and the interior, not being exposed to the rains and wind, will be preserved in a better condition than the outer portion of the shocks. In localities having wet, rainy, and warm autumns it is necessary to make smaller shocks—8 or 10 hills square. The fodder should not be left in these small shocks longer than is necessary for it to become well cured. In such small shocks nearly all of the stalks are exposed and cure quickly. The corn should then be husked out and the stover placed in larger shocks or the fodder should be hauled to the barn and placed where it will be dry. If allowed to remain in the small

shocks, rains will leach from the fodder the soluble and most palatable and nutritious food elements and render the stover dry, brittle, tasteless, and of little feeding value.

### SPACING OF SHOCK ROWS.

It is always best to have the shock rows straight across the field, and if the corn has been checked the shock rows can be made straight in two directions. This is very essential when the ground is to be sown to fall wheat. In this case wide shock rows are advisable, and by means of the corn binder and bundle carrier this result can be easily accomplished (fig. 6).

### JERKING AND STORING THE EARS UNHUSKED.

Jerking the ears and storing them unhusked is a method of harvesting employed in some sections, especially in the South, where the argument usually given in its favor is that if the husks are on the ears they are more protected from the grain weevil. The destruction of corn by this insect is one of the drawbacks to more extensive corn culture in the South, and it is hoped that tests will be made having as their object the determination of practical methods whereby large quantities of corn can be kept free from destruction by this grain weevil. As soon as the corn becomes dry enough to crib, weevils are frequently found working under the husks on the kernels of the ears, sometimes to the number of twenty or more to the ear. It is a question worthy of careful experimentation to determine whether the corn is more seriously injured by transferring the weevil with the unhusked ears to the crib than would result were the corn husked in the field, causing the weevils to drop to the ground and thereby leaving most of them in the field.

The total amount of work required to jerk the corn and afterward husk it is considerably greater than that required to husk it directly from the standing stalk, and the quantity of forage obtained by gathering the husks is not sufficient to pay for the extra work. Much better forage could be obtained more cheaply by other methods. If the husks are sold advantageously for mattress making it is well to perform the two operations of jerking the ears and afterward husking them in a manner that will furnish husks of good quality. The proportion of husk varies greatly among the different kinds of corn, but it is sufficient to say that it requires fully one-half more room to store the ears unhusked than husked.

### HUSKING FROM THE SHOCK.

In sections where the farms range in area from 80 to 160 acres and diversified farming is followed so that all of the stover is fed, husking

from the shock is a common method of harvesting the ears. Figures 7 and 8 show some of the forms of husking pegs, gloves, and hooks in general use. Such gloves are too clumsy to be used except when very cold weather makes the use of gloves necessary. For

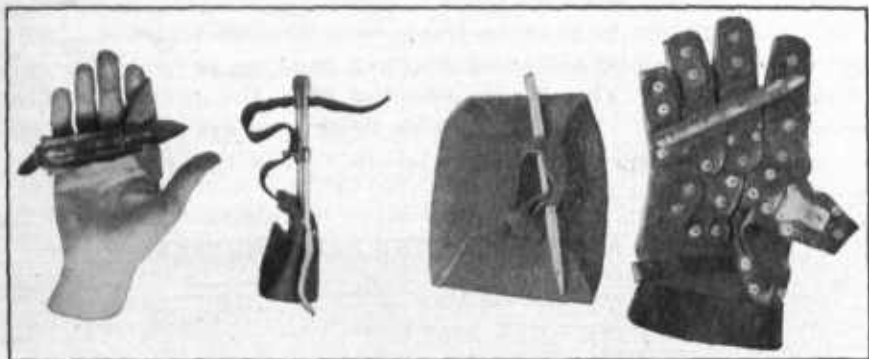


FIG. 7.—Four forms of husking pegs.

keeping the ears clean and to facilitate loading the piles of corn into the wagon, sheets of ducking 6 or 7 feet square are of very great assistance and should be universally used rather than to throw the ears upon the ground, where they may become damp or even muddy

and from whence it is necessary to pick them by hand. As the corn should be hauled and stored soon after it is husked, a great supply of these sheets is not necessary, for as soon as the pile of corn from one shock is loaded the sheets are ready for use at other shocks.

Where the shocks yield 4 or 5 bushels of corn it will be necessary to throw some of the ears into the wagon by means of a basket; the remaining ears can then be thrown into the wagon



FIG. 8.—Two forms of husking hooks.

quickly by two men, each taking hold of two corners of the canvas and transferring the corn on the sheet directly into the wagon. Boxes or troughs are in some sections employed in place of sheets, but the sheets are lighter and in every way more satisfactory. During

very dry and windy weather corn should not be husked from the shock, as the loss of stover is too great. Calm days when the fodder is slightly damp are ideal for husking shocked corn.

The mistake is sometimes made of husking shocked corn for animals which have plenty of time and would enjoy husking it for themselves. This is true of animals carried through the winter that need no more grain than is found on the quantity of fodder they will eat without waste. This method of feeding can not be followed with animals on full feed, as they would waste the larger quantity of stover in their endeavors to get a full feed of grain and would not obtain as much grain as fattening cattle should eat.

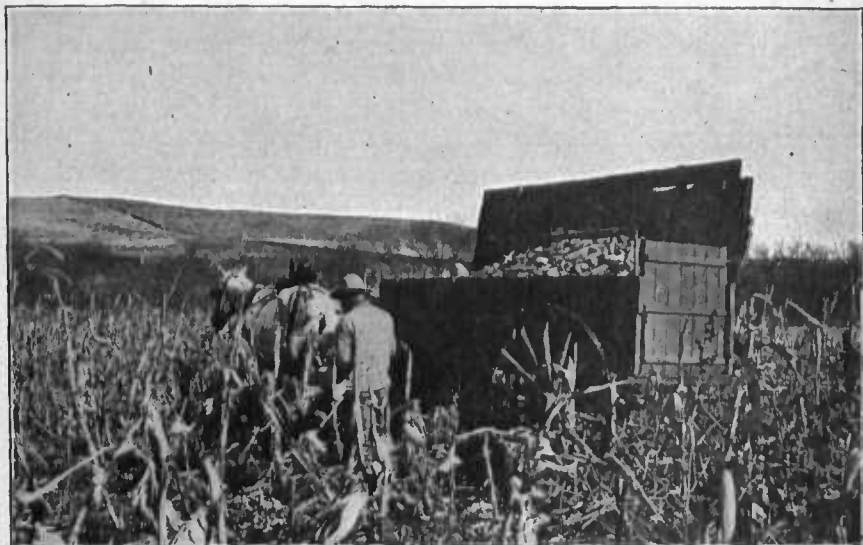


FIG. 9.—Wagon equipped with throw-board for catching the ears and with platform end gate for ease in scooping out the load.

### HUSKING FROM STANDING STALKS.

Figure 9 illustrates the usual method in the Central States of gathering corn from the standing stalks when it has become dry enough to crib. As there is ordinarily not much work for the teams at this time of the year it is quite customary for each husker to have a team and wagon, or two men can accompany each wagon. In husking from the standing stalks the pegs, hooks, and gloves and peg shown in figures 7 and 8 are quite generally used, but many who prefer "hooks" for husking shocked corn find husking pegs preferable for husking standing corn. In husking from standing stalks it is customary to have on one side of the wagon a very high throw-

board, against which the ears can be tossed and caused to drop into the wagon without the necessity of the husker looking up to see whether the ear has been thrown over the wagon; the noise made by the ear when it strikes against the throw-board is sufficient.

"Lands" are laid out and driven around in husking by this method so that the husker is always on the same side of the wagon and there are no down rows to husk except one for each new land started. When there are more men than teams available it is customary to have a number of men husk into the same wagon and one man haul the corn to the crib and unload. Upon his return to the field he will leave the empty wagon to be filled and take the other to the crib.



FIG. 10.—Shredder and husker in operation. The shredded stover is blown to the center of the feed shed.

With the proper number of huskers to suit the distance the corn must be hauled the work can usually be arranged so as to avoid any waiting or loss of time.

### HAULING TO THE CRIB.

In order to save labor and hasten the work of hauling the corn crop to the crib the wagon beds should be so deep that it will not be necessary to fill them more than level full; otherwise, ears will be lost along the road on the way to the crib. Unless the cribs are equipped with an arrangement, such as may be found at the grain elevators, for dumping the load by lowering the two hind wheels of the wagon and allowing the load to roll out, the wagon should have a rear end gate

and a high shoveling board which can be lowered on reaching the crib and the scooping of the load begun at once. A wagon thus equipped is shown in figure 9. Without an end gate that will permit of the immediate use of the scoop shovel, about twice the time is required to unload.

Most successful farmers during corn-harvesting time have each load of corn that comes from the various fields passed over the wagon scales and a record made, so that at the end of the harvest the yield of each field and the quantity of grain stored will be known.

### USE OF CORN-PICKING MACHINES.

At the present time much interest is being manifested in machines designed to gather the ears from the standing stalks and deliver them into a wagon driven by the side of the machine. To the man who has spent many cold disagreeable days, with sore hands, husking corn, the use of such a machine is very attractive. These machines are in their experimental stage and to their use at present there are some objections, the principal ones being that the corn is not as well husked as when husked by hand.

Some ears are skipped and others are knocked off and left in the field. If the ma-

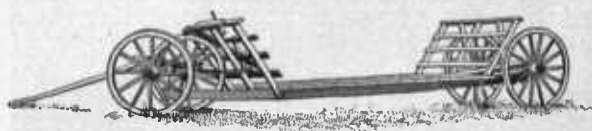


FIG. 11.—Rack for hauling corn fodder.

chine is equipped with a husking attachment considerable corn will be shelled in the husking and lost in the field. If the husking attachment is removed and the machine used as a corn picker, the ears can be run through a husker at the crib and the shelled corn saved. For extensive use in large fields that contain few gullies or obstacles corn pickers and huskers can be successfully employed and the crop more quickly harvested, but for the general farmer who with the aid of his regular farm help can husk by hand during the early winter what corn has not been cut for stover these machines are not profitable investments in their present state.

The proper planning of farm work so as to supply to the hired help steady employment throughout the year is the best method of maintaining sufficient competent labor upon the farm. Each farmer should so plan his work that he can employ his help by the year. It is only by so doing that competent help can be prevented from flocking to the factories and cities, where steady employment can be obtained. Corn husking can be performed at a time when other farm duties are not pressing.



## USE OF HUSKERS AND SHREDDERS.

The use of shredding machines is becoming quite general in many corn-growing sections. Sometimes the machines are used for shredding the stover after the ears have been husked from the shocks by hand and in other cases both the husking and shredding are done by the machine. The shredding of the stover puts it in a more compact form for storing and a more convenient form for feeding and avoids the troublesome work of handling manure in which there are long coarse corn stalks. Shredded stover is fed with much less waste than stover in any other condition. It has been estimated that shredded stover will go 40 per cent farther in feeding cattle than the whole stalks and considerably farther than when the stalks are put through a feed cutter. As there are shredders of varying capacities, a farmer



FIG. 12.—Rall pens without covers sometimes used for storing corn.

can own a machine suited to the amount of work to be performed. Shredding fodder by the acre and shredding and husking by the bushel are practices that are gaining favor in many sections, where crews operate huskers and shredders and travel from farm to farm. The blowing of the shredded stover from the shredder and husker to the center of a feed shed (fig. 10), so that shredded stover can be fed in racks around the general supply, is a very economical way of using corn stover.

## STORING THE STOVER.

Whether the stover is shredded or not, it is of great importance that it be well stored and not left long exposed to the weather. The mistake is sometimes made of placing the hay crop in sheds and barns and leaving the corn stover in shocks in the field. The reverse is better, inasmuch as most kinds of hay will not depreciate so rapidly in feeding value and will keep better in stacks and ricks than corn stover. Unless placed under cover corn stover should be fed in the fall and early winter. If left exposed until February or March it has little feeding value. There is considerable labor connected with

the hauling and storing of corn stover and racks and wagons should be arranged to avoid any unnecessary labor. Figure 11 illustrates a rack that can be made on the farm and attached to the running gear of the farm wagon. In hauling the fodder or stover from 20 acres of corn this rack will save labor enough each year to pay for its cost.

In the principal corn-producing States the autumns are usually dry, and corn fodder dries thoroughly in the shocks and is shredded and stored in barns or feed sheds with little danger of heating or molding. The fodder should not be wet when shredded and stored, but damp days are preferable for doing the hauling and shredding because the blades are more pliable and the fodder is therefore handled with less waste. But in some sections, especially in northern States, where the corn is full of sap when cut and where damp fall weather prevails, much care is necessary in storing corn fodder or stover to prevent heating and molding. In such localities it should be placed under cover in ricks not more than 6 or 8 feet in thickness, or, if shredded, layers of dry straw several inches deep should alternate with layers of the shredded stover. The depth of the layers of stover can vary from several inches to a foot or more, according to its dryness when stored. The dry straw will take up some of the moisture from the stover and prevent heating.

### STORING THE EARS.

There was a time in the history of the corn-producing belt when rail pens (fig. 12) were about the only available means of storing the corn crop. Much to the discredit of some corn growers this method of storing is still in vogue, even in sections where good means of storage could be afforded at little expense. It is no uncommon sight to see rail pen after rail pen filled with ears of corn and without any cover, exposed to all the rains and snows of winter, and these in sections of the country that produce the most corn and are consequently most interested in higher-priced corn. This corn remains in apparently good condition during the cold weather and is usually placed upon the market in early spring. Filled with water, it is not long after it is loaded into box ears or vessels until it heats and spoils. The installation of elevators where such corn can be kiln dried has been brought about by this poor manner of storing the corn crop. There is now a general prejudice against kiln-dried corn resulting from the fact that kiln drying was first employed and is at present employed to a very large extent to prevent further heating and fermentation of corn that was not allowed to dry properly or was poorly stored before being placed upon the market. This state of affairs, which results from allowing the corn to remain wet during winter and necessitates the removal of the water by expensive means, keeps



the price of corn lower than it would be if the corn were allowed to dry in the fields and kept dry until placed upon the market. Grain buyers would pay a better price if the general supply of corn reached them in a condition that would insure its preservation without drying and the resulting shrinkage.

Less than 4 per cent of the corn crop of the United States is shipped from this country either as corn or as corn meal, and there is in some of the European countries a strong prejudice against American corn, due to the

fact that much of it reaches these foreign countries in a condition unfit for human food. It is clearly not profitable to transport a low grade of corn such distances to be sold as poor food for stock. This state of affairs can be entirely overcome by allowing the corn to dry thoroughly in the field and then keeping it well stored until it is transported. The proper method of treating the corn crop can be quickly brought into general practice if farmers, grain buyers, boards of trade, shippers, and all who have a voice in the market price of corn insist that the price be influenced in proportion to the moisture content of the corn.

### CONVENIENT CRIBS.

In addition to affording thorough ventilation to the stored grain and protection from driving rains, the cribs should be constructed in



FIG. 13.—Double cribs, 240 feet long, divided into bins 6 by 8 feet to facilitate drying of the corn.



FIG. 14.—Double cribs arranged for both loading and unloading from a central driveway. The eaves should extend farther over the sides.

such a manner that they can be filled and emptied with the least possible labor. For level ground, double cribs with an elevated driveway and approaches that will enable the loads to be driven through the cribs and dumped or scooped out of the wagons without any high pitching are very satisfactory. A crib of this kind which is filled from the central driveway is shown in figure 13. The compartments of this crib are emptied from doors near the ground on the outside. The bins of which these double cribs are composed are of small size, 6 by 8 feet and 13 feet deep, thus affording the stored grain considerable ventilation. Figure 14 shows a similar crib which is both filled and emptied from the central driveway. This arrangement puts the

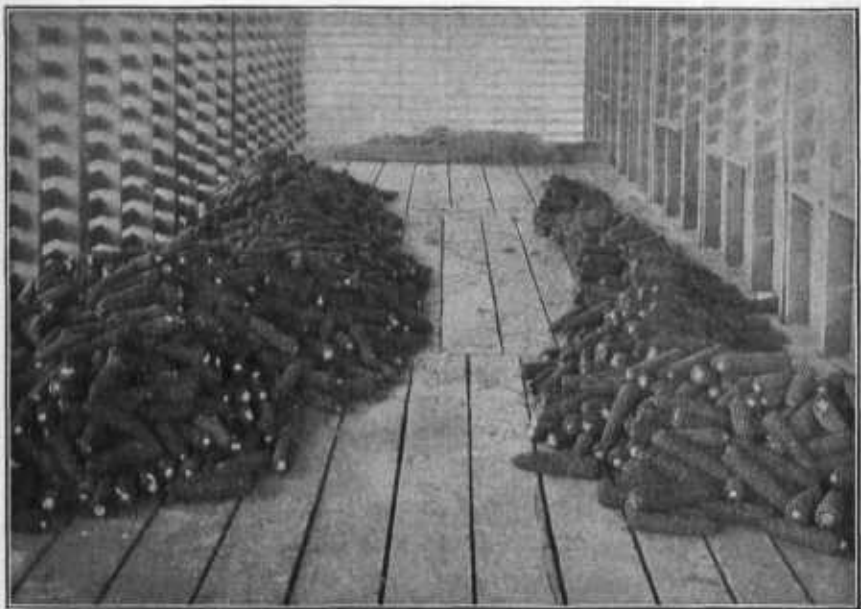


FIG. 15.—Interior view of corncribs shown in figure 14.

laborers under shelter while filling the wagons in removing the crop from the crib, but it necessitates somewhat higher pitching of the corn in unloading the wagons. Figure 15 is an interior view of one side of the cribs shown in figure 14. On sloping ground equally convenient cribs can be constructed at less expense by extending the crib in such a manner that it can be filled from the upper side and emptied from the lower side. This is a very convenient arrangement, and if the slope of the hill is considerable a driveway can be made below the crib so that with properly constructed chutes the ears can be allowed to roll into the wagons, avoiding the labor of scooping. Such a side-hill crib is shown in figure 16. As the sides should be left as open as possible to permit of a good circulation of air, it is quite necessary

that the eaves extend well down over the sides of the crib so as to protect the corn from driving rains and snows.

### PROTECTING THE CROP FROM INSECTS, MICE, AND RATS.

In sections where insects are destructive to stored grain, cleanliness is of value in preventing injury from this source. Small quantities of grain should not be left in the cribs during the summer, as they tend to harbor these pests. Where insects are destructive to the stored grain, it is a good practice to dispose of the entire crop as early as possible and clean the cribs thoroughly, so that there

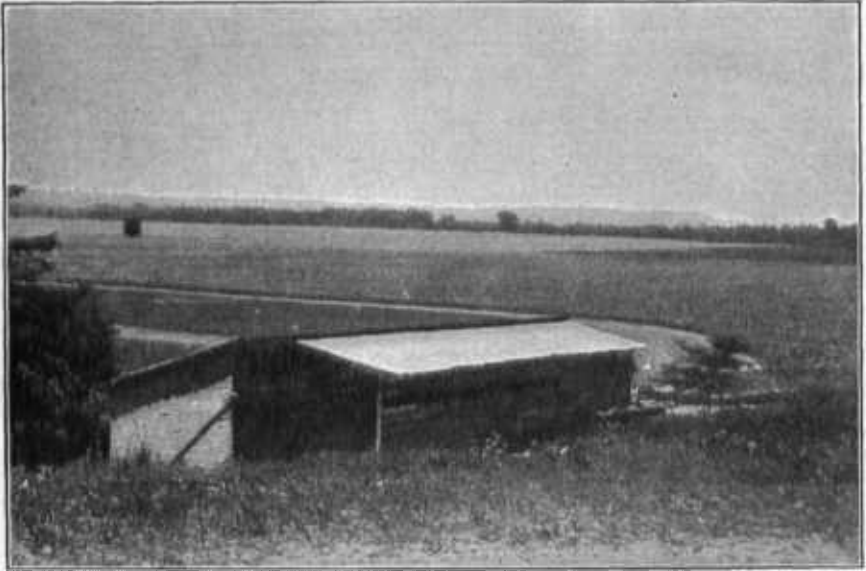


FIG. 16.—Convenient side-hill crib—easily filled from upper side and very easily emptied from lower side.

are left few hiding places and no food to carry the insects through the summer. In southern localities, where the weather is warm enough to permit these pests to work throughout the entire year, it is best to construct the cribs so that they can be made practically air-tight and then to treat the crop with some insecticide such as carbon bisulphid.<sup>a</sup>

<sup>a</sup> A general consideration of the principal insects injurious to stored grain is given in Farmers' Bulletin 45, Carbon Bisulphid as an Insecticide, in which remedies are also discussed. In the event of severe injury or doubt as to the nature of the insects, it is advisable to send specimens to the Bureau of Entomology for identification, which will enable the giving of advice as to the best method of control.

As a protection against rats, mice, and sparrows, galvanized wire netting of about one-fourth-inch mesh can be successfully used in the construction of corneribs. This wire netting can be tacked to the inside of the uprights of the crib, and the strips which constitute the sides of the crib can also be nailed on the inside of the uprights, thus holding the wire netting in place. As a floor, which should be 18 inches or more from the ground, so as not to afford a hiding place for rats, the wire netting can be tacked to the sleepers and the flooring nailed over to hold the wire in place. For overhead protection the wire netting is simply tacked to the joists.

If cribs are built upon solid concrete foundations through which rats can not burrow, no netting will be needed for the floor and the structure can be kept near the ground. With ample roof projection and upper ventilation no danger from dampness need be feared.

#### **METHODS OF HARVESTING IN RELATION TO SOIL FERTILITY.**

The tendency of the present times is to find use for every part of the corn plant. There are more than 40 distinct products made from various parts of this plant, and the effect of the removal of all these products from the farm is to deplete its fertility. Those who expect to continue the production of good crops of corn must keep the fertility of the land in view and have as much as possible of the corn plant consumed on the farm, selling only the completed and finished products. Stalks left standing in the field should be cut as soon as the crop is removed, so that the stalks may decay rapidly and not interfere with the following crops. Early cutting not only allows more time for decay, but early-cut stalks decay more rapidly and completely. Stalk cutters are very effective and inexpensive implements. They are made for two horses and cut one row every time they are driven across the field, or for three horses and cut two rows every time the field is crossed. Figure 17 shows one designed for cutting two rows. Wherever possible, corn should be shelled on the farm and the cobs returned to the soil.



FIG. 17.—Three-horse stalk cutter which cuts two rows.

## WHAT CONSTITUTES A BUSHEL OF CORN.<sup>a</sup>

The laws of the majority of States recognize 70 pounds of ears as a bushel of corn. Some few States specify that previous to January a bushel of ears shall weigh 72 pounds. Almost without exception the State laws specify that 56 pounds of shelled corn shall constitute a legal bushel. Unless the strain of corn has exceedingly large cobs and short kernels the legal bushel of 70 pounds of ears will yield when shelled 56 pounds of grain, or the legal bushel of shelled corn. A struck bushel of kernels of different strains of corn will vary in weight from 50 to 64 pounds.

## SHRINKAGE.

The shrinkage that will take place in a crib of corn from the time it is cribbed in the fall until it is sold varies so greatly in accordance with the amount of moisture the corn contains when placed in the crib, and also the ventilation of the crib, that it is impossible to state a percentage of shrinkage that will apply with certainty to any particular crib of stored corn. Some carefully conducted tests in Illinois<sup>b</sup> showed that during a period of twenty-one months the shrinkage was but 9 per cent of the original weight of the corn cribbed. Other tests show that during the first year the shrinkage in cribbed corn from December to June varies from 8 to 18 per cent, with an average of 14½ per cent for the first year and an average of 20 per cent for two years.

For the ten years from 1896 to 1905 the Chicago price of corn for the month of May has averaged 3.8 cents per bushel, or 8.9 per cent, higher than the December price. As the average price in May is 3.8 cents higher than in December, a shrinkage of 8.58 per cent of the fall weight will equalize the increase in price, so that the same amount would be received whether the crop be sold in December or in May.

Estimating interest on the value of the corn at 6 per cent, a shrinkage of 5.84 per cent will make it immaterial whether the selling be done in December or in May.

In cases where 72 pounds are sold as a bushel in December and 70 pounds in May, estimating interest at 6 per cent, a shrinkage of 8.45 per cent will make it immaterial whether the selling be done in December or May.

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<sup>a</sup> See Bulletin No. 51, Part V, Bureau of Plant Industry, entitled "Legal and Customary Weights per Bushel of Seeds."

<sup>b</sup> Illinois Agricultural Experiment Station Bul. 113, The Shrinkage of Ear Corn in Cribbs.

In many local points there is a much greater difference between prices in December and in May than is shown by Chicago market prices. It will, of course, be necessary for each farmer to decide for himself whether it is more profitable to sell his crop at harvest time or hold it for higher prices. Corn that has not been kept dry during the winter is usually disposed of in early spring for the reason that it is likely to spoil upon the approach of warm weather. In general it is therefore better for the farmer who has cared for his corn crop well during the winter to hold it till summer or early fall, so that the price for his crop will not be governed by that paid for wet, low-grade corn thrust upon the market in early spring.